

# 2021 HIGHLIGHTS

## Task 63 – Solar Neighborhood Planning

### THE ISSUE

A large portion of the potential for energy efficiency in buildings and the potential to utilize solar energy still remains unused. The combination of making buildings more energy efficient – through refurbishment interventions and new developments – and increasing the use of renewable energy sources is key for moving towards a low carbon energy transition. The increased use of solar energy is one of the important development paths. The urban fabric needs to utilize passive solar gains and daylight to reduce the energy use in buildings, as well as to improve the inhabitants' comfort in indoor and outdoor areas. In addition, active solar energy systems integrated in the urban context contribute to the production of renewable energy as heat and electricity. All these strategies help cities and citizens to reach sustainable development targets.

### OUR WORK

The main objective of SHC Task 63 is to support key players to achieve solar neighborhoods that facilitate long-term solar access for energy production and for daylighting buildings and outdoor environments – resulting in sustainable and healthy environments. Key players include developers, property owners/associations, architects, urban planners, municipalities, and institutions. The Task's scope covers solar energy issues related to new neighborhood development and existing neighborhood renovation and development.

Solar energy aspects include active solar systems (solar thermal and photovoltaics) and passive solar strategies. Passive solar strategies include passive solar heating and cooling, daylighting, and thermal/visual comfort in indoor and outdoor environments.

The types of support being developed include design strategies for new and existing communities with focus on solar energy and methods for securing sunlight access and right to light. Furthermore, the Task is working on economic strategies and business models for improving the use of passive and active solar energy. Apart from economic values, added values or co-benefits of solar energy are considered. Another objective is to study the workflow of tools needed to support decisions in all planning stages (tool chain). All this work will be capped off with case studies from each participating country connecting the close ties to practice and implementation.

#### Participating Countries

*Australia*

*Canada*

*China*

*Denmark*

*France*

*Norway*

*Italy*

*Sweden*

*Switzerland*

Task Period

2019 – 2023

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### KEY RESULTS IN 2021

#### Simulation of Neighborhood Archetypes to Study Solar Design Strategies

Neighborhood simulation to optimize energy efficiency and solar access and understand the impact of various technologies is becoming increasingly significant for the development of sustainable and resilient cities. However, simulating urban areas is challenging and involves several degrees of complexity. Therefore, courses for Ph.D. students and advanced master's students are planned. The first of two courses ("Fall Schools") was held as a virtual event during September-October 2021 to study selected neighborhood archetypes. The defined archetypes are selected to represent typical or future neighborhood layouts to see how these could be developed to achieve high solar access and long-term sustainability. This first Fall School enrolled 14 students from different countries and institutions, and nine instructors were involved (mostly from the Task). The goal of the course was to enhance the knowledge of Ph.D. and advanced master's students in simulating and analyzing the performance of neighborhoods. ([See Solar Update article, December 2021](#)).

#### Urban Surface Uses

Several activities are ongoing to support the planned publication on surface uses in neighborhoods. The report, ready in early 2022, will describe the definition and classification of urban surfaces and show different ways to use such surfaces. Potential conflicts and synergies of urban surface uses and co-benefits will be highlighted. There is great potential to use urban surfaces more efficiently, both in existing neighborhoods and when planning new developments.

#### Tools and Workflows

The report "Identification of existing tools and workflows for solar neighborhood planning" to be finalized in early 2022 includes chapters on:

- I. Tool overview (literature review)
- II. National common indicators
- III. Workflow stories
- IV. Benchmark study
- V. Conclusions

The provided common indicators demonstrate a wide range of different metrics used for active and passive solar energy. Overall, it was found that there is hardly any legislation on (direct) solar access or other related indicators for outdoor environments. Further, daylight and solar access needs may be conflicting with indoor thermal comfort, but there are very few indoor thermal comfort indicators in any legislation. Therefore, there is a need for increasing R&D in this area.

The Task's Workflow Stories are one way to obtain data and knowledge from external actors (e.g., companies) on how they are using tools for solar neighborhood planning.

Finally, a benchmark study was carried out to compare the solar irradiation modeling of a neighborhood using different software. This study mainly focuses on the modeling of irradiation on façades.

#### Case Studies

Case Studies on solar neighborhood planning are ongoing in participating countries. These studies will serve as a platform for exchanging experiences from practice. This work includes testing developed strategies and tools in practice and interviewing relevant stakeholders.

